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RESEARCH PAPER

Tree Adoption in the North-East Philippines Uplands: Analysis of a GO-NGO Partnership

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Abstract In recent decades, the Philippines have put much effort into designing strategies for motivating upland communities to plant trees. The accomplishments of these programs have been variable, however, and need further investigation. Focusing on five villages located in the uplands in north-east Luzon, this paper assesses the response to a government program that supplied tenure security to upland farmers in exchange for tree planting, implemented through an NGO project that supported farmers with advice, logistics and free seedlings. Response was measured as the percentage of households that joined the program, the percentage of their lots that they submitted for tenure contract and the percentage of these lots that were actually planted with more than 50 trees. The resulting overall tree adoption rate was that 22% of the lots in the villages had been planted, with a variation of 15–35% between villages. Main motivational factors were the land tenure prospect and the perceived stable markets for fruit and timber. Farmers were not only motivated but also capacitated, both financially and in terms of the bureaucratic procedures, by the NGO project. Without these, the government program could only have benefited the few well-off and educated farmers. The case study stands, therefore, as an example of effective government-NGO partnership.

Keywords Tenure security · Tree plantation · Upland communities · Project assistance

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Introduction

The accelerated rates of deforestation during recent decades have caused concern to governments of many developing countries. Massive forest degradation has contributed to national disasters including flooding, drought and soil erosion. Timber supply shortage occurs in many countries (Waggener 2001). Consequently, governments have been occupied with developing strategies to motivate farmers, communities, people's organizations, private companies and other individual landholders to engage in tree planting. These efforts, and the variations in performance among small-scale forestry support programs (e.g. Harrison et al. 2004), have prompted research on peoples' motivations to plant trees, or reluctance to do so, generating results that are of use to tree planting motivating programs (e.g. Scherr 1995a, b; Arnold and Dewees 1995, 1998; Mercer 2004; Pasicolan et al. 1997; Roshetko et al. 2003; Nair et al. 2004; Schuren and Snelder 2008; Snelder and Lasco 2008).

Factors that influence farmers' motivations to plant trees vary with social, economic and biophysical conditions. For example, the relatively long waiting period before benefits from trees can be derived discourages resource-poor farmers from integrating trees on their farmland because they believe tree farming will reduce their present income from their agricultural crops (Arnold 2001; Snelder et al. 2007). The integration of fast growing trees such as gmelina (*Gmelina arborea*) may reduce the waiting period between planting and harvesting, whereas the processing of harvested tree products will add value to the final product and may strengthen farmers' motivation to plant trees once more (Roshetko et al. 2003). Financial assistance, in the form of subsidies and loans and the provision of free planting materials, are measures that may likewise strengthen farmers' motivation, mitigating the initial high costs of tree plantation establishment. However, measures such as these do not always ensure the success of forestry projects (Hyman 1983; Pasicolan 1996; Colchester 2002; Harrison et al. 2004). The presence of marketing facilities can be another factor in motivating farmers to plant trees, as reported by various sources in the literature (e.g. Nibbering 1999; Roshetko and Yuliyanti 2003; Calderon and Nawir 2004; Scherr 2004). Finally, land tenure has a rather complex influence on tree planting motivations. Households plant trees in a wide variety of tenurial contexts (Arnold and Dewees 1998), with some studies referring to a positive relationship between tree planting and insecure land tenure (e.g. Schuren and Snelder 2008) and other studies reporting the opposite, i.e. more tree planting on land with secure property rights (e.g. Romero 2006). The distinction between the security of access to trees and access to land and the use of tree planting as a means to secure land tenure are some of the explanations for this complexity.

The overall 'net balance' of positive and negative aspects of tree planting as perceived by farmers, eventually determines farmers' motivation and the overall success of any tree planting encouragement program. There are various ways of measuring success of such programs but one key aspect of success is whether program motivation has led to tree adoption, meaning that farmers have made a decision followed by actual planting and managing trees on their land. Adoption here refers to a mental process from first hearing about an idea or practice, like the

planting of trees on degraded land, to deciding to make full use of the idea, as explained by Mercer (2004).

This study evaluates the accomplishments of a tree planting motivation program in terms of household tree adoption in the Philippines through a case study in San Mariano, Isabela Province, north-eastern Luzon. The study identifies the levels of response towards tree adoption and discusses the factors that underlie this response. The overall goal is to provide information that can help in increasing the chances of success of future tree planting programs. Specifically, the paper addresses the following questions: (1) How has the program been implemented and what has been the level of success in terms of tree adoption? (2) What factors have facilitated or constrained tree adoption? (3) What lessons may be learned from the experiences of this program?

SIFMA: A Tree Planting Motivation Program in the Philippines

Between 1934 and 1988, Philippine forest cover declined at an average annual rate of 198,000 ha (Kummer 1992; Lasco et al. 2001; Chokkalingam et al. 2006). In order to address deforestation and the economic, social and ecological problems attached to it, the private sector and local communities are encouraged by the Philippine government to invest in plantation establishment and tree-based farming systems. Tree planting has been a major component of almost all forestry programs in the country since the 1980s, though with limited success (Snelder and Lasco 2008).

The Socialized Industrial Forest Management Program (SIFMA) is one of the latest government forestry programs in the Philippines and is part of the umbrella program on Community-Based Forestry Management (CBFM; see also Utting 2000). Its primary objective is to produce wood and non-wood forest products (DENR undated, Harrison et al. 2004). In practice, the program focuses on timber trees but trees of any kind (firewood, fruit trees) are allowed (DENR 2004). Individuals and households can avail up to a maximum of 10 ha of public land for tree planting while groups or associations are allowed a maximum of 500 ha. In return for tree planting, the program supplies a tenurial instrument for 'SIFMA holders', with a contract life of 25 years, renewable for another 25 years, if the holder meets the specified performance responsibilities. These include planting trees on not less than 90% of the plantable area (the remaining 10% can be used for agricultural crops), using only open and denuded public forestland and protecting existing natural forest vegetation. The SIFMA holder is given the right to develop, manage and utilize the forestland and to harvest, utilize and sell the planted trees in accordance with the government allocation system (DENR 1996). The Department of Environment and Natural Resources (DENR) is in charge of the delineation of SIFMA areas and the monitoring and evaluation of the holder's responsibilities and harvested products. The SIFMA holder is further exempted from forest charges on all plantation products (DENR 1996). The benefits for the government are in the form of rehabilitation of degraded forest land, a steady supply of wood, SIFMA application fees (PhP 500[1] for 1–5 ha and PhP 10,000 for 300–500 ha), and rentals

[1] Exchange rate: $1 US = PhP 47.45, as at 6th October 2008.

from the use of the land (PhP 300/ha for the 6th up to 10th year of lease and PhP 500/ha from the 11th year onwards), paid by the SIFMA holders (NSMNP-CP Plan International 2002).

The Study Area

San Mariano is one of the municipalities in Isabela province with land areas located within the buffer zone of the Northern Sierra Madre Natural Park. It consists of 36 villages with a total land area of 146,950 ha. The municipality has a total population of 44,704 individuals with 8,794 families (NSMNP-CP Plan International 2002).This study concentrates on five adjacent villages in the buffer zone, located 10–15 km east of San Mariano town. The characteristics of the villages are summarized in Table 1. The villages consist of 1,093 households with 5,400 people. The majority of the village inhabitants are recent migrants from the provinces of Ilocos, Pangasinan and La Union. The ethnic make-up comprises Ifugao, Ibanag, Kalinga, Agta and Ilocano, the latter dominating in terms of population. The Ifugaos typically occupy degraded forestland far from the village centres in areas with limited accessibility during the rainy season. Notably, Ifugaos have a long tradition of making terraces for rice irrigation in their places of origin in the Cordillera Mountains in central Luzon.

San Mariano was a major commercial logging centre from the 1960s up to 1992, when the municipality was placed under a logging moratorium. Many labourers of logging companies then turned to agriculture. The logging moratorium was followed by the implementation of successive people-oriented forestry programs including Integrated Social Forestry (ISF) in 1993 and SIFMA in 1997. At present, the land use around villages is characterized by patches of residual forest, grassland, and arable fields with rice, corn, banana and other crops. Tree plantations, orchards and agroforestry farms are also present, mostly set up within the framework of the various forestry programs.

Land Tenure Arrangements

Small portions of land in the village centres have been declared available for private ownership. Because the villages are located on forestland with slopes of over 18%—regarded as public land in the Philippine legal system—official land claims are mostly through several tenurial instruments awarded by the DENR. The most informal land right recognized within the community is called ‘position’ and accrues to the individual who first opened and cultivated a piece of public land. Farmers often plant a few trees along the boundary to mark their ‘position’. One step more formal is the land claims made through tax declaration, wherein an individual declares a piece of land to be under their ‘position’ and pays annual land taxes to the local government unit. In return, the individual receives a tax declaration certificate that, although it does not provide legal land ownership, can be used as proof of claim in case the land is declared available for titling. The formal tenurial instruments besides SIFMA are the Certificate of Stewardship Contract

Table 1 Characteristics of the five villages in San Mariano, Isabela, Philippines

Village	Land area (ha)	Total number of households	Dominant ethnic groups	Existing land tenure	Number of households interviewed	Lot area of respondent households (ha)			Number of trees per hectare planted by respondent households		
						Range	Average	Standard deviation (±)	Range	Average	Standard deviation (±)
Casala	23,639	203	Ilocano and Ifugao	Tax declaration, SIFMA, others	21	1.3–10.0	5.0	2.0	0–432	61	106
Del Pilar	13,165	257	Ilocano and Ifugao	Tax declaration, SIFMA, others	32	0.6–12.4	5.2	3.3	0–393	45	89
Dibuluan	12,232	220	Ilocano, Kalinga	Tax declaration, SIFMA, others	39	0.5–11.4	4.8	3.0	0–852	89	178
San Isidro	5,902	94	Ilocano	SIFMA	13	0.3–8.5	2.4	1.7	0–525	89	116
San Jose	11,105	319	Ilocano	Tax declaration, titles, SIFMA, others	28	0.5–10.0	5.9	2.8	0–750	88	135
Total	66,043	1,093			133	0.3–12.4	4.7	2.9	0–852	75	135

Source: NSMNP-CP Plan International 2000a, b, c, d, e; POPMAT 2002; fieldwork conducted in 2003

(CSC), Industrial Forest Management Agreement (IFMA) and Community-Based Forest Management Agreement (CBFMA); these are included under 'others' in Table 1. These instruments are not relevant for this study because they do not apply to the areas available for SIFMA.

The Implementation of SIFMA in the Study Area

The Northern Sierra Madre Natural Park Conservation Project (NSMNP-CP) has been an important entity in the implementation of SIFMA in the municipality of San Mariano. The main objectives of this project, which was funded by the Dutch government between 1996 and 2005, were to rehabilitate degraded forest areas and provide socio-economic support to the population within the park and buffer zones. The project assisted the DENR in its implementation of SIFMA, considering the tenurial instrument of this program as a means to accomplish its objectives (General 2005). From their field office in San Jose (one of the villages in this study), the NSMNP-CP assisted farmers in their application for a SIFMA contract and provided them with free planting materials (of their own choice) and technical assistance in laying out agroforestry and tree plantations. Moreover, the project helped setting up People's Organizations (POs, converted to formal cooperatives in 2002) the members of which were trained to spearhead, amongst other tasks, the conservation and protection of the park and monitor and evaluate the progress of the SIFMA plantations.

Research Method

The survey was conducted in one of the major SIFMA areas of Isabela Province in the buffer zone of the natural park (NSMNP), east of San Mariano town. A total of 133 SIFMA applicants were randomly selected from the list of SIFMA applicants obtained from the DENR. Semi-structured questionnaires were set up to gather information on land tenure, the SIFMA application process, assistance of DENR and NSMNP-CP, land use before and after SIFMA, household capacity and motivation to join the SIFMA, and location of SIFMA plots. The questionnaires were tested in a nearby village before conducting the interviews. The heads of the households served as respondents. The activities carried out on the 204 SIFMA lots of these households were investigated, and for each household the total number of lots, their area, tenure and the number of trees planted were recorded. A 'lot' in this study is defined as one continuous area used by one household that is either completely devoted to tree planting or divided into several fields used for trees, crops or fallow. A 'SIFMA area' refers to the overall area near a village delineated by the DENR as available for SIFMA applications and thus includes various SIFMA lots. Other types of information such as the distance between a lot and the farmer's residence, the reasons for participation in the SIFMA project, and the type of crops planted by farmers before and after SIFMA application were also gathered. Besides households, other actors involved in SIFMA implementation were interviewed, including representatives of the Local Government Unit, officials of people's organisations,

and staff of the DENR and NSMNP-CP. Secondary data including names of SIFMA holders, areas awarded, maps and other relevant documents were gathered from the offices of the DENR and the NSMNP-CP (DENR 1996, 1999, 2004; NSMNP-CP 1998; NSMNP-CP Plan International 2000a, b, c, d, e, 2001) and from academic reports of the Cagayan Valley Program on Environment and Development (CVPED) based at Isabela State University (Geelkerken 1997; Jongman 1997; Serdiene 1999; Gilsing 2001; Klein 2003; Snelder and Masipiqueña 2003; Tulfer 2003).

An important question in this study has been how to define 'success' of the tree-planting motivation program. Bureaucratically, success could refer to whether the farmers followed the major obligation in the SIFMA contract, i.e. to plant forest tree species (including non-timber species) on the SIFMA lot and limit the planting of agricultural crops to 10% of the SIFMA area. A more practical approach is to determine success in terms of the adoption of trees by the participant households. Has the SIFMA program been successful in motivating farmers to plant trees and converting their motivations into actual tree planting, i.e. tree adoption? This study follows the latter approach for which the planting of more than 50 trees (that also survived the seedling stage) on a lot by a SIFMA participant household is regarded as tree adoption. The choice of 50 trees per lot (average lot area 4.7 ha $\pm$ standard error of 2.9 ha) as threshold criterion for tree adoption is based on the numbers and packages of free tree seedlings distributed among SIFMA households. Tree planting of any form and species combination has been considered, including timber tree plantations, fruit orchards, boundary planting, intercropping and scattered planting. Field observation suggested plant spacing for timber trees were usually smaller (gmelina 2 $\times$ 2 m to 3 $\times$ 4 m) than those for fruit trees (e.g. mandarin: 6 $\times$ 6 m; mango 16 $\times$ 16 m). Moreover, a stepwise assessment has been used (cf Wideman 2002), that focuses first on the number of households that joined the SIFMA program in a particular village, the number of lots submitted for SIFMA by these households (the 'SIFMA lots'), and the number of SIFMA lots actually planted with more than 50 trees. In the stepwise assessment, the overall success rate is expressed as:

$$\text{Overall success rate} = \text{HH}_{\text{joined}} \times \text{L}_{\text{submitted}} \times \text{L}_{\text{planted}},$$

where '$\text{HH}_{\text{joined}}$' is the fraction of the households of a given village that joined the SIFMA program, '$\text{L}_{\text{submitted}}$' is the fraction of lots submitted by households for a SIFMA contract out of the 'submittable' total within the SIFMA-delineated area, and '$\text{L}_{\text{planted}}$' is the fraction of these lots actually planted with more than 50 trees.

This set-up allows distinguishing, for instance, between a village where many households join enthusiastically but then submit or plant little, and a village where households are more reluctant to join but do plant trees if they join.

The ascription of tree planting to a SIFMA project begs the question of additionality. Would not farmers have planted trees anyway, without SIFMA? This could be the case in the study area, for instance, if farmers would add trees to an existing (non-SIFMA) plantation. This issue was discussed during the interviews, and a check was made of whether households had planted trees before joining SIFMA. Both approaches indicated that the number of trees that would have been planted without SIFMA would have been very low. Spontaneous tree planting was

occurring to some extent in the area and in the Philippines in general (as reported for example by Garrity and Mercado 1994), but there was little planting on the SIFMA lot before the start of the program. Farmers explained this by their need for short-term cash income and their lack of capital to invest in trees. In this study therefore, all trees planted are ascribed to SIFMA. To validate the information obtained from the interviews, visits were made to 70 of the 204 SIFMA lots. In most cases, the visits found no major discrepancies between the interviews and the field data on the number and types of trees planted. Where discrepancies were observed, these were noted and adjustments were made to reflect the ground truth data.

Results: Impact of SIFMA

This section reports results of the stepwise assessment, and details on land-use change and distance between homesteads and planted plots.

Household Participation (HH_{joined})

Applications for SIFMAs by households from the study sites began in 1998, the first contracts being awarded in March 1999. By March 2002, about 53% of the households in the study area had applied for SIFMAs (Table 2). There was considerable variation in the rate of applications between villages, with 43% for Casala and 84% for San Isidro. Misunderstanding, wait-and-see attitude and lack of trust were some of the reasons mentioned why many households did not apply. Rumours about the NSMNP-CP being a communist organization created fear among the local people that their lots would be taken by the project if they applied for a SIFMA (Gilsing 2001; Tulfer 2003). This conception still remained in the mind of some households, even after several years of interaction between the project and the community. Some households simply did not want to take the risk and waited to see what would happen to the first applicants. However, after they saw the benefits of awarded land tenure and free tree seedlings provided to the SIFMA holders many of these households requested the NSMNP-CP to assist them in applying for a SIFMA.

Table 2 Percentage of households joining SIFMA in five villages in San Mariano, Isabela, Philippines

Village	Total number of households	Number of household applicants	Percentage of households joining SIFMA (HH_{joined})
Casala	203	87	43
Del Pilar	257	164	64
Dibuluan	220	136	62
San Isidro	97	81	84
San Jose	319	115	36
Total	1096	583	53

Source: NSMNP-CP (2002)

Fraction of Lots Submitted for SIFMA ($L_{submitted}$)

Table 3 reports the percentage of household lots (within the SIFMA area) which were submitted for SIFMA. Differences between villages were relatively small, application rates ranging between 60% for Del Pilar and 86% for San Jose.

Fraction of Tree Planting on SIFMA Lots ($L_{planted}$)

This parameter relates to whether farmers actually planted more than 50 trees on the lots submitted for SIFMA contracts. These data are summarized in the second last column of Table 4. Except for Del Pilar with a tree planting rate on the SIFMA lots of only 38%, application rates per village ranged between 55 and 75%. In Del Pilar, most respondents are Ifugaos who concentrate particularly on planting rice. Taken over the total of SIFMA lots in the villages, the tree planting rate was 57%.

Table 3 Percentage of lots submitted to SIFMA by 113 respondent households in five villages in San Mariano, Philippines

Village	Total no. of lots of respondent households	No. of lots within SIFMA area[a]	No. of lots submitted for SIFMA	Percentage of lots submitted for SIFMA ($L_{submitted}$)
Casala	40	32	24	75
Del Pilar	86	79	47	60
Dibuluan	82	82	62	76
San Isidro	46	46	35	76
San Jose	47	42	36	86
Total	301	281	204	73

[a] Some lots of the respondent households are outside the delineated SIFMA area, most of which have other tenurial instruments such as CSCs, CBFMA or tax declaration

Table 4 Stepwise success assessment of SIFMA implementation in five villages in San Mariano, Isabela, Philippines

Village	Percentage of households joining SIFMA (HH_{joined})	Percentage of lots in SIFMA area submitted for SIFMA ($L_{submitted}$)	Percentage of submitted lots planted with more than 50 trees($L_{planted}$)	Overall success rate of SIFMA implementation (%)
Casala	43	75	62	20
Del Pilar	64	60	38	15
Dibuluan	62	76	55	26
San Isidro	84	76	63	35
San Jose	36	86	75	23
Total	53	73	57	22

Overall Success Rate of the SIFMA Implementation

Multiplying the three parameters, the overall success rate for the SIFMA lots of all villages combined was 22% out of the 100% it would have been if all households had joined and planted all their lots (Table 4). Overall, the implementation cannot be called a massive success but it certainly did make a difference in tree adoption among SIFMA farmers. Notably, implementation has continued since the observations were made.

Table 4 shows the usefulness of the three-step analysis in that it provides more insight than simply examining the degree of tree adoption finally achieved. For instance, the low overall performance in Del Pilar is caused by the low planting rate on individual lots and not by low percentages of participating households or lots submitted for SIFMA contract. This is because the Ifugao inhabitants of Del Pilar were strongly attracted by the tenure security offered by SIFMA but not by tree planting, being focused on short-term income acquisition. For San Jose, Table 4 shows that relatively few households joined SIFMA but those who joined had high adoption rates.

Land Use of Planted Lots

Table 5 lists the land use of the 204 lots submitted for SIFMA by the sample farmers. Land uses include:

(a) *Grassland*. This category includes 54 lots with less than 20 trees per hectare and no crops. Many of these lots were under long fallow. Some lots had patches of shrubs and non-commercial forest tree species; other had recently been burnt to prepare for planting.
(b) *Agricultural land*. A total of 121 lots were planted with rice, white corn, yellow corn, bananas, vegetables and some minor crops, in pure stands or in combination, out of which the yellow corn was fully—and the bananas and vegetables were partially—for the market. Some lots were planted with bananas that were recently attacked by a disease (bunchy top virus) and were to be replanted. Lots that were fallowed but recultivated every 3 years or less (i.e. short fallow) were also considered to be agricultural land.
(c) *Agricultural land with planted trees*. The 14 lots included in this category, mostly in San Jose and Dibuluan, are primarily cultivated with agricultural crops but enriched with a few fruit or forest trees.
(d) *Residual forest with patches of other uses*. Sixteen lots were largely covered with forest trees grown back after the commercial logging companies left. They also included plantations of forest trees, bananas and other fruits, all established by the farmers.

Table 5 shows that agricultural lots (with or without trees) were the most popular sites for farmers to add trees. About 68% of lots initially without trees and 79% of lots initially with trees now had 50 or more trees added. A strong preference of fruit trees (mainly mango and citrus) over forest trees was evident. Only nine lots contained timber trees (all *gmelina*), compared with 47 which had fruit trees The

Table 5 Land use change in the lots submitted for SIFMA of the 133 households in the five villages in San Mariano, Isabela, Philippines

Land use		Village					Total
Before SIFMA	After SIFMA	Casala	Del Pilar	Dibuluan	San Isidro	San Jose	
Grassland	a. No change	4	5	19	2	1	31
	b. Agricultural	1	1	1	0	0	3
	c. Agricultural with fruit trees added	1	1	2	0	0	4
	d. Agricultural, fruit trees and forest trees added	1	3	1	0	1	6
	e. Forest trees only added	1	0	0	0	0	1
	f. Fruit trees added	1	1	1	3	0	6
	g. Fruit trees and forest trees added	2	0	0	0	0	2
Agricultural	a. No change	4	14		9	4	38
	b. Fruit trees added	4	4	8	11	5	32
	c. Fruit trees and forest trees added	4	6	11	7	16	44
	d. Forest trees added	1	1	4	0	1	7
Agricultural with forest or fruit trees	a. No change	0	1	0	0	2	3
	b. Fruit trees added	0	0	1	0	2	3
	c. Forest trees added	0	0	0	0	1	1
	d. Fruits and forest trees added	0	0	6	0	1	7
Residual forest with patches of other use	a. No change	0	8	1	2	2	13
	b. Fruit trees added	0	1	0	1	0	2
	c. Fruit and forest trees added	0	1	0	0	0	1
Total		24	47	62	35	36	204

fruit trees were usually planted on relatively flat land with agricultural crops between rows. Combining trees with annual crops was found popular in that maintenance and monitoring activities for both crops can be conducted at the same time. Forest trees were mostly planted in sloping areas and along boundaries of lots.

Distances of Planted Lots

In response to questions about the distribution of trees in SIFMA lots, farmers often referred to distances between their place of residence and the SIFMA lots. Most lots were located within 45-minute walking time, and for the farmers in San Isidro, San Jose and Dibuluan most lots could be reached within 15 minutes. Table 6 summarizes these distances and adds the percentage of those lots that were planted with trees ('$L_{planted}$'), by distance class. It appears that a steep drop in this percentage sets in at distances of three quarters of an hour walking time from farmstead to lot.

Table 6 Distance of SIFMA lots from residence and relative success rate of tree planting in five villages in San Mariano, Isabela, Philippines

Distance[a] (min)	Total SIFMA-submitted lots	No. of lots with more than 50 trees	Percentage of lots with more than 50 trees
0–15	76	57	75
16–45	84	50	60
>46	44	9	20
Total	204	116	57

[a] Distance is expressed as walking time

Discussion: Motivations for Household Tree Adoption

Various factors help explain the responses of the households to the SIFMA program as implemented through NSMNP-CP. One basic motivational factor has been the tenure security offered by SIFMA. All villages are situated on public land and any improvement of the de jure status of land holdings is important to most farmers. This was evident from the interviews in this study and those discussed elsewhere (e.g. General 2005) and may also be inferred from Table 4. The highest rate of household participation (84%) was found in San Isidro, where 'position' (i.e. the most insecure form of land tenure) was as yet the only form of land claim of the inhabitants. This weakest of claims was prevalent as well in the villages of next highest participation (Del Pilar 64% and Dibuluan 62%).

The second basic motivational factor was the income prospects connected with trees, especially fruit trees from which farmers expected to generate a substantial cash income on a regular basis in the near future. The idea of planting fruit trees for income generation was encouraged by the NSMNP-CP whom they trusted to take care of the market connections in spite of the relatively remote locations of the villages. In present-day reality the market linkages for fruits were not yet well developed, except for bananas, with farmers being dependent on a few middlemen, e.g. as observed by Snelder et al. 2007, fruit was purchased from farmers in San José by eight rice and corn traders who had included fruit in their trading package.

The planting of forest trees was associated not with expected regular income but with ability to generate cash in emergency situations through timber sale. Farmers anticipated that by the time their children grew up the forest would be depleted and no longer serve this buffer function. Finally, some farmers planted trees along boundaries of sloping areas to prevent soil erosion. Farmers' motivations for planting trees identified in this study correspond to the findings of studies on farmers' adoption of trees reported elsewhere (e.g. Arnold and Dewees 1995, 1998; Nibbering 1999; Roshetko and Yuliyanti 2003; Calderon and Nawir 2004; Scherr 2004; Snelder et al. 2007; Roshetko et al. 2008; Schuren and Snelder 2008), in which profitability and security of tenure and market access have usually proved to be the key motivational factors.

Three more incidental and local motivational factors were interrelated with the basic ones. The major reason for the low rate of household participation in San Jose

was an experience with a previous development project that failed to fulfill its promises. In San Isidro, the village with the highest overall accomplishment of SIFMA implementation (35% of participants), no negative experiences with previous projects were reported, and local leaders and officials played a highly active intermediary role between the project and the villagers. Similar observations on factors influencing farmers' participation in conservation projects were reported by Walters et al. (1999). In July 2003, an intense typhoon crossed the region and severely damaged most of the established fruit and forest plantations. This did not discourage most of the respondents from planting but because citrus trees (*Citrus* sp.) were less damaged than mangoes (*Mangifera indica*) and coconuts (*Cocos nucifera*), the farmers requested more citrus trees in case free seedlings would be distributed again.

Besides these general motivations to join, nominate lots and plant them, spatial characteristics determined where the trees would be planted. In the interviews, farmers especially pointed out that distance between residence and trees is an important factor in the choice of where to plant trees. A preference to plant close to the residence facilitates special care and creates a tendency to plant on agricultural lots, since these also tend to be close to the farmstead, as shown in Tables 5 and 6. These findings on distance and species selection correspond to those reported in West Java (Indonesia) where tree species with high-level management requirements are preferably planted close to residences (e.g. in homegardens) and those requiring few inputs, being managed on an extractive basis, are preferably planted on farms away from the residence, e.g. the dudukuhan tree farms (Manurung et al. 2008).

In order to act, both motivation and *capacity* are needed. Obtaining a SIFMA contract and subsequently establishing a plantation or agroforestry system entails a substantial investment by farmers. The formal policy and contract conditions must be understood and interpreted; the trustworthiness of the information and the actors need to be assessed; travel time and money must be invested in surveying the lots, document reproduction, payment of filing and other fees; the market for seedlings must be explored, and seedlings found and paid for; often, new knowledge must be acquired; the trees must be planted and maintained, even though they will not pay back the investment for several years. Due to this relatively high investment level inherent in tree adoption, resource endowment is consistently found as a salient factor in tree adoption (e.g. Mercer 2004), implying that only the richer households can access the benefits of trees. Farmers in the research area, having mostly entered the region recently and starting from scratch, availed of only low capital on average. Moreover, they had virtually no knowledge to ease their way into the bureaucratic procedures. As a result, a SIFMA policy without facilitation support, consisting only of the tenure regulations and communication of these in the villages, would have been likely to trigger investments only by a few well-off and well-informed households, if any.

Capacitating the farmers has been the major role of the NSMNP-CP project, which provided logistical support, help with the paperwork, technical support, market information and free seedlings. The interviews with the farmers confirmed that the project had been essential for the success of the SIFMA in their villages.

Conclusion

Tree planting has been encouraged by the SIFMA project, with field-level NGO assistance, in the households of five upland villages in the Philippines. A three-tiered analysis of tree adoption (responding households, lots entered into the program, lots actually planted) has supported the understanding of household responses. Overall, half of the households responded to the program, and more than 50 trees were actually planted on 22% of their lots within the SIFMA-delineated areas.

Major motivations to adopt trees were the de jure tenure security offered by SIFMA, the regular income prospects associated with fruit trees and the role of forest trees as a future income buffer in emergency situations.

Households require both motivation and capacity to plant trees. Trees adoption has an intrinsic constraint here due to the long wait from tree planting to selling timber. If only for this reason, tree adoption benefits are often only accessible to the already well off. In the study villages and the SIFMA program, this constraint was aggravated by the complex paperwork needed, the unavailability of seedlings, and the lack of information on markets Lifting these capacity constraints was exactly the work done by the NGO that supported the farmers to enter SIFMA. Without it, the SIFMA would have remained a paper tiger. Enhanced by markets that were perceived as sufficiently attractive and stable, the SIFMA represents an example of effective GO and NGO synergy, with the government supplying the tenurial instrument as the motivational foundation and the NGO focusing on breaking the capacity barrier. This arrangement certainly deserves further study and replication.

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